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U. S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

**PLANE COORDINATE
PROJECTION TABLES**

FLORIDA
(LAMBERT and TRANSVERSE MERCATOR)

SPECIAL PUBLICATION NO. 255

U. S. Department of Commerce

Charles Sawyer, *Secretary*

Coast and Geodetic Survey

Robert F. A. Studds, *Director*

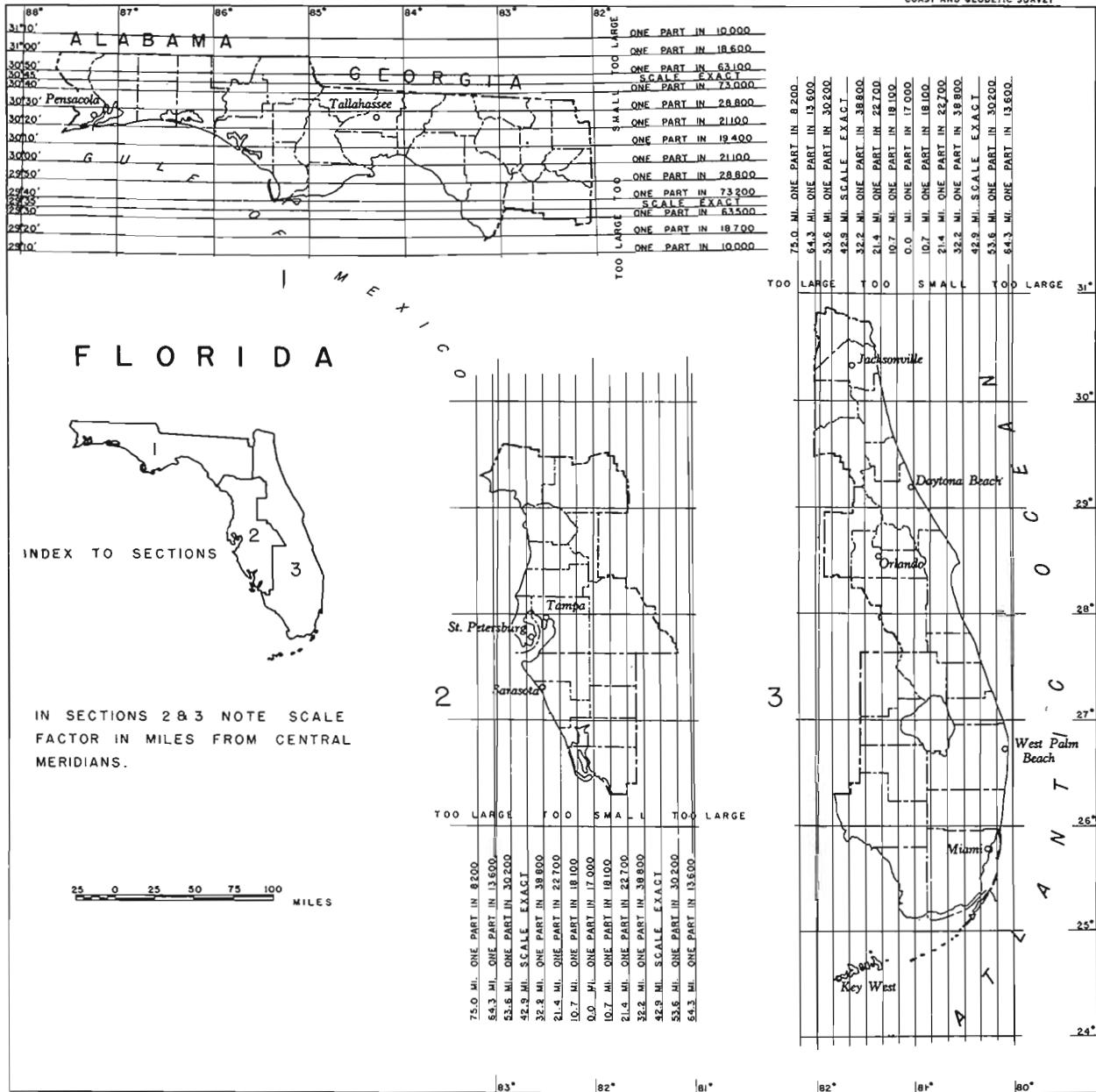
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PLANE COORDINATE PROJECTION TABLES FLORIDA



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U. S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY



Foreword

The plane coordinate system used in this State is based on two conformal projections. The northern part of the State uses a Lambert conic projection with two standard parallels, while the southern part has a transverse Mercator projection, with two zones, using a reduced scale for the central meridian of each zone. The tables in this publication are to be used for the conversion of geographic positions to plane coordinates or plane coordinates to geographic positions. The various constants of the projections are listed herein.

The methods of computation have been designed for machine calculation. For computation on the transverse Mercator projection all the required functions are given in this table. However, for computation on the Lambert projection, tables of natural trigonometric functions will be required. A table of these functions has been published by the Coast and Geodetic Survey in Special Publication No. 246. This contains sines, cosines, and tangents to ten decimal places with an interval of ten seconds for 0° to 6° . It is sold for a nominal sum by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

The formulas and sample computations which follow show the general methods for computing either type of coordinates on either type of projection.

THE LAMBERT PROJECTION

Plane Coordinates from Geographic Positions

$$x = R \sin \theta + C$$

$$y = R_b - R \cos \theta$$

Grid azimuth = geodetic azimuth - θ + second term

where

R is the radius for the latitude of the station,

R_b is a constant for a zone,

θ is the mapping angle for the longitude of the station,

and

C is the value of x assigned to the Central Meridian for a zone.

The second term for the reduction of geodetic to grid azimuths may be neglected for most work. However, for lines five miles or more in length, if the same degree of accuracy is desired as is obtained by geographic computations, this term should be evaluated and used.

$$\text{Second term} = \frac{x_2 - x_1}{2\rho_0^2 \sin l''} \left(y_1 - y_0 + \frac{y_2 - y_1}{3} \right)$$

Geographic Positions from Plane Coordinates

The formulas show the method of computing R and θ from which the latitude and longitude may be obtained.

$$x' = x - C$$

$$\tan \theta = x' \div (R_b - y)$$

$$R = (R_b - y) \div \cos \theta$$

$$\Delta \lambda = \theta \div \ell$$

$$\lambda = \text{Central Meridian} - \Delta \lambda$$

where

R, R_b, θ and C are the same as previously defined

and

ℓ is a constant for a zone.

THE TRANSVERSE MERCATOR PROJECTION

Plane coordinates from geographic positions

$$x = x' + 500,000$$

$$x' = H \cdot \Delta\lambda'' \pm a b$$

$$y = y_0 + V \left(\frac{\Delta\lambda''}{100} \right)^2 \pm c$$

Grid azimuth = geodetic azimuth - $\Delta\alpha$ - second term

$$\Delta\alpha'' = \Delta\lambda'' \sin \phi + g$$

where

y_0 , H , V , and a are based on the latitude
of the geographic position,

and

b , c , and g are based on $\Delta\lambda''$.

$$\Delta\lambda'' = \text{Central Meridian} - \lambda$$

and

$\Delta\alpha''$ is the convergence of the meridian
at the station with respect to the
Central Meridian.

The second term for the reduction of geodetic to grid azimuths may be neglected for most work. However, for lines five miles or more in length if the same degree of accuracy is desired as is obtained by geographic computations, this term should be evaluated and used.

$$\text{Second term} = \frac{(y_2 - y_1)(2x_1' + x_2')}{(6\rho_0^2 \sin 1'')g}$$

Geographic positions from plane coordinates

$$P(x'/10,000)^2 + d = V(\Delta\lambda''/100)^2 + e$$

$$y_o = y - P(x'/10,000)^2 - d$$

Obtain the latitude from the table of y_o .

Use latitude to obtain H from the table.

$$x' = x - \underset{\text{constant}}{\cancel{500,000}}$$

$$\text{approximate } \Delta\lambda'' = x' \div H.$$

Determine a from latitude and b from approximate $\Delta\lambda$
then

$$\Delta\lambda'' = (x' + a - b) \div H$$

$$\Delta\alpha'' = Mx' - e$$

M is based on the y and e on the x and y of the plane coordinates.

PLANE COORDINATES ON LAMBERT PROJECTION

(Condensed form for calculating-machine computation)

$$X = R \sin \theta + C$$

$$C = 2,000,000.00$$

$$Y = R_b - R \cos \theta$$

$$R_b = 36,454,924.53$$

State-Zone Florida - North
Grid Az. = Geod. Az. - θ

Station	Latitude	R	$\sin \theta$	X
	Longitude	θ	$\cos \theta$	Y
¹ Tyler, 1937	29 39 06.589	36,217,879.95	+ 0.01522 05004	2,551,254.26
	82 45 52.412	+ 0 52 19.5748	0.99988 41614	241,240.01
	Grid azimuth to azimuth mark			63° 04' 22"
² Cedar, 1934	29 38 51.982	36,219,355.46	- 0.00368 25612	1,866,620.01
	84 55 11.533	- 0 12 39.5845	0.99999 32193	235,814.66
	Grid azimuth to azimuth mark			282 02 37"
3				0 1 "
	Grid azimuth to azimuth mark			
4				

GEODETIC POSITIONS FROM LAMBERT COORDINATES
(CALCULATING MACHINE COMPUTATION)

STATE-ZONE Florida - North $l = 0.50252590$

Station Clark, 1937

C	- 2,000,000.00	R _b	36,454,924.53
X	2,584,545.94	Y	- 273,356.05
X' = X - C	+ 584,545.94	R _b - Y	36,181,568.48
$\tan \theta = X' \div (R_b - Y)$	+ 0.01615 590.38	θ	+ 3,332" 1045
θ	+ 0 55' 32.1045	$\Delta \lambda = \theta \div l$	+ 6,630" 712
$\cos \theta$	0.99986 95189	$\Delta \lambda$	+ 1° 50' 30.712
$R = (R_b - Y) \div \cos \theta$	36,186,290.11	Central Meridian	84° 30' 00.000
ϕ	29° 44' 19.315	$\lambda = C.M. - \Delta \lambda$	82° 39' 29.288

Station Canal, 1934

C	- 2,000,000.00	R _b	36,454,924.53
X	1,775,355.24	Y	- 329,421.94
X' = X - C	- 224,644.76	R _b - Y	36,125,502.59
$\tan \theta = X' \div (R_b - Y)$	- 0.00621 84536	θ	- 1,282" 6316
θ	- 0 21' 22.6316	$\Delta \lambda = \theta \div l$	- 2,552" 369
$\cos \theta$	0.99998 06660	$\Delta \lambda$	- 0° 42' 32.369
$R = (R_b - Y) \div \cos \theta$	36,126,201.05	Central Meridian	84° 30' 00.000
ϕ	29° 54' 14.169	$\lambda = C.M. - \Delta \lambda$	85° 12' 32.369

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form No. 744b

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(Condensed form for calculating-machine computation)

State	Florida	Zone West	Central meridian	82° 00' 00" 000
Station	Forest, 1937	Fort, 1937		
φ	27 51 00.823	27 35 40.837		
λ	82 03 20.911	81 59 22.744		
$\Delta\lambda = \text{Central mer.} - \lambda$	- 0° 03' 20.911	+ 0° 00' 37.256		
$\Delta\lambda''$	- 200.911	+ 37.256		
$\left(\frac{\Delta\lambda''}{100}\right)^2$	4.037	0.139		
H	89.766 006	89.975 593		
V	1.016 720	1.010 481		
a	- 0.828	+ 1.110	- 0.840	+ 0.206
b				
$x' = H \cdot \Delta\lambda \pm ab$	- 8,034.06	+ 3,351.96		
$V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$	4.103	0.140		
Tabular y	1,278,199.81	1,185,299.19		
x	481,965.94	503,351.96		
y	1,278,203.91	1,185,299.33		
$\Delta\alpha''$	- 93.86	+ 17.26		
$\Delta\alpha$	- / 33.9	+ 17.3		
Geod. Az. to Az. Mk.	92 12 33.8	271 37 57.7		
Grid Az. to Az. Mk.	92 14 08	271 37 40		

$$x = x' + 500,000$$

$$y = \text{Tab. } y + V \left(\frac{\Delta\lambda''}{100} \right)^2 \pm c$$

$$\Delta\alpha'' = \Delta\lambda'' \sin\phi + g$$

Grid Az. = Geod. Az. - $\Delta\alpha$

H and V = Tab. H and Tab. V.

When ab is -, decrease $H \cdot \Delta\lambda$ numerically.
+ increase $H \cdot \Delta\lambda$

g increases $\Delta\lambda'' \sin\phi$ numerically.

GEODETIC POSITIONS FROM TRANSVERSE MERCATOR COORDINATES
(CALCULATING MACHINE COMPUTATION)

STATE - ZONE Florida - East

Station Flat, 1934

X	769,063.91	Y	448,675.56
C	- 500,000.00	$P(\frac{X'}{10,000})^2 + d$	- 827.08
X'	+ 269,063.91	Y_o	447,848.48
P	1.14242	Approx. $\Delta\lambda = X' \div H$	+ 2,938
d	+ 0.02	$\Delta\lambda = (X' + ab) \div H$	+ 2,938.259
H	91.575 821	$\Delta\lambda$	+ 48' 58".259
a b	- 0.941	Central Meridian	81 00 00.000
ϕ	25° 33' 56.735	$\lambda = C.M. - \Delta\lambda$	80° 11' 01.741

Station Mabel, 1937

X	194,399.86	Y	1,544,689.16	
C	- 500,000.00	$P(\frac{X'}{10,000})^2 + d$	- 1,214.86	
X'	- 305,600.14	Y_o	1,543,474.30	
P	1.30081	Approx. $\Delta\lambda = X' \div H$	- 3,428	
d	+ 0.01	$\Delta\lambda = (X' + ab) \div H$	- 3,427.716	
H	89.157 768	$\Delta\lambda$	- 57' 07".716	
a b	- 0.793	+ 9.289	Central Meridian	81 00 00.000
ϕ	28 34	90	$\lambda = C.M. - \Delta\lambda$	81° 57' 07".716

Station

X		Y			
C	-	$P(\frac{X'}{10,000})^2 + d$	-		
X'		Y_o	"		
P		Approx. $\Delta\lambda = X' \div H$	"		
d		$\Delta\lambda = (X' + ab) \div H$	"		
H		$\Delta\lambda$	"		
a b		Central Meridian	"		
ϕ	°	' "	$\lambda = C.M. - \Delta\lambda$	°	' "

Station

X		Y			
C	-	$P(\frac{X'}{10,000})^2 + d$	-		
X'		Y_o	"		
P		Approx. $\Delta\lambda = X' \div H$	"		
d		$\Delta\lambda = (X' + ab) \div H$	"		
H		$\Delta\lambda$	"		
a b		Central Meridian	"		
ϕ	°	' "	$\lambda = C.M. - \Delta\lambda$	°	' "

When $a b$ is $+$, decrease X' numerically

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Constants for Florida

Constant	Zone	
	East	West
Central Meridian	81° 00' 00"000	82° 00' 00"000
log R	-255.5	-255.5
Scale reduction (Central Meridian)	1 : 17,000	1 : 17,000
$\log \left(\frac{1}{6\rho_0^2} \right) g$	4.582 1873 -20	4.582 1873 -20
$\log \left(\frac{1}{6\rho_0^2 \sin 1''} \right) g$	9.896 6124 -20	9.896 6124 -20
$\left(\frac{1}{6\rho_0^2 \sin 1''} \right) g$	0.7882×10^{-10}	0.7882×10^{-10}

North zone

Constant		Constant	
C	2,000,000,00 ft.		
Central Meridian	84° 30' 00"000		
R _b	36,454,924.53 ft.	$\log \frac{1}{2\rho_0^2 \sin 1''}$	0.373 4934 -10
y _o	424,481.48 ft.		
ℓ	0.502 52590	$\log \ell$	9.70115 84500 -10
$\frac{1}{2\rho_0^2 \sin 1''}$	2.363×10^{-10}	$\log K$	7.67654 59915

Lambert Projection for Florida - North

Table I.

Lat.	R ft.	Y ^t Y value on central meridian feet	Tabular difference for 1 sec. of lat. feet	Scale in units of 7th place of logs	Scale expressed as a ratio
29° 00'	36,454,924.53	0	101.02100	+669.1	1.0001541
01	36,448,863.27	6,061.26	101.02050	+643.8	1.0001482
02	36,442,802.04	12,122.49	101.02033	+618.9	1.0001425
03	36,436,740.82	18,183.71	101.02000	+594.4	1.0001369
04	36,430,679.62	24,244.91	101.01967	+570.2	1.0001313
05	36,424,618.44	30,306.09	101.01933	+546.4	1.0001258
29° 06'	36,418,557.28	36,367.25	101.01917	+522.9	1.0001204
07	36,412,496.13	42,428.40	101.01883	+499.8	1.0001151
08	36,406,435.00	48,489.53	101.01850	+477.1	1.0001099
09	36,400,373.89	54,550.64	101.01817	+454.7	1.0001047
10	36,394,312.80	60,611.73	101.01817	+432.7	1.0000996
29° 11'	36,388,251.71	66,672.82	101.01783	+411.0	1.0000946
12	36,382,190.64	72,733.89	101.01750	+389.7	1.0000897
13	36,376,129.59	78,794.94	101.01733	+368.8	1.0000849
14	36,370,068.55	84,855.98	101.01700	+348.2	1.0000802
15	36,364,007.53	90,917.00	101.01683	+328.0	1.0000755
29° 16'	36,357,946.52	96,978.01	101.01683	+308.2	1.0000710
17	36,351,885.51	103,039.02	101.01650	+288.7	1.0000665
18	36,345,824.52	109,100.01	101.01617	+269.6	1.0000621
19	36,339,763.55	115,160.98	101.01617	+250.8	1.0000577
20	36,333,702.58	121,221.95	101.01600	+232.4	1.0000535
29° 21'	36,327,641.62	127,282.91	101.01583	+214.4	1.0000494
22	36,321,580.67	133,343.86	101.01567	+196.7	1.0000453
23	36,315,519.73	139,404.80	101.01550	+179.4	1.0000413
24	36,309,458.80	145,465.73	101.01533	+162.4	1.0000374
25	36,303,397.88	151,526.65	101.01517	+145.8	1.0000336
29° 26'	36,297,336.97	157,587.56	101.01517	+129.6	1.0000298
27	36,291,276.06	163,648.47	101.01500	+113.8	1.0000262
28	36,285,215.16	169,709.37	101.01483	+ 98.3	1.0000226
29	36,279,154.27	175,770.26	101.01483	+ 83.2	1.0000192
30	36,273,093.38	181,831.15	101.01483	+ 68.4	1.0000157
29° 31'	36,267,032.49	187,892.04	101.01467	+ 54.0	1.0000124
32	36,260,971.61	193,952.92	101.01467	+ 39.9	1.0000092
33	36,254,910.73	200,013.80	101.01450	+ 26.2	1.0000060
34	36,248,849.86	206,074.67	101.01450	+ 12.9	1.0000030
35	36,242,788.99	212,135.54	101.01450	0.0	1.0000000

Lambert Projection for Florida - North

Table I (Cont'd.).

Lat.	R ft.	Y' Y value on central meridian feet	Tabular difference for 1 sec. of lat. feet	Scale in units of 7th place of logs	Scale expressed as a ratio
29° 36'	36,236,728.12	218,196.41	101.01433	- 12.6	0.9999971
37	36,230,667.26	224,257.27	101.01450	- 24.8	0.9999943
38	36,224,606.39	230,318.14	101.01433	- 36.7	0.9999915
39	36,218,545.53	236,379.00	101.01433	- 48.2	0.9999889
40	36,212,484.67	242,439.86	101.01433	- 59.3	0.9999863
29° 41'	36,206,423.81	248,500.72	101.01450	- 70.1	0.9999839
42	36,200,362.94	254,561.59	101.01433	- 80.5	0.9999815
43	36,194,302.08	260,622.45	101.01450	- 90.5	0.9999792
44	36,188,241.21	266,683.32	101.01450	-100.2	0.9999769
45	36,182,180.34	272,744.19	101.01450	-109.5	0.9999748
29° 46'	36,176,119.47	278,805.06	101.01450	-118.4	0.9999727
47	36,170,058.60	284,865.93	101.01467	-127.0	0.9999708
48	36,163,997.72	290,926.81	101.01467	-135.2	0.9999689
49	36,157,936.84	296,987.69	101.01483	-143.1	0.9999671
50	36,151,875.95	303,048.58	101.01483	-150.6	0.9999653
29° 51'	36,145,815.06	309,109.47	101.01500	-157.7	0.9999637
52	36,139,754.16	315,170.37	101.01517	-164.5	0.9999621
53	36,133,693.25	321,231.28	101.01517	-170.9	0.9999606
54	36,127,632.34	327,292.19	101.01533	-176.9	0.9999593
55	36,121,571.42	333,353.11	101.01533	-182.6	0.9999580
29° 56'	36,115,510.50	339,414.03	101.01567	-187.9	0.9999567
57	36,109,449.56	345,474.97	101.01567	-192.9	0.9999556
58	36,103,388.62	351,535.91	101.01583	-197.5	0.9999545
59	36,097,327.67	357,596.86	101.01617	-201.7	0.9999536
30° 00	36,091,266.70	363,657.83	101.01617	-205.5	0.9999527
30° 01'	36,085,205.73	369,718.80	101.01650	-209.0	0.9999519
02	36,079,144.74	375,779.79	101.01650	-212.1	0.9999512
03	36,073,083.75	381,840.78	101.01683	-214.8	0.9999505
04	36,067,022.74	387,901.79	101.01700	-217.2	0.9999500
05	36,060,961.72	393,962.81	101.01717	-219.3	0.9999495
30° 06'	36,054,900.69	400,023.84	101.01750	-220.9	0.9999491
07	36,048,839.64	406,084.89	101.01767	-222.2	0.9999488
08	36,042,778.58	412,145.95	101.01800	-223.1	0.9999486
09	36,036,717.50	418,207.03	101.01817	-223.7	0.9999485
10	36,030,656.41	424,268.12	101.01833	-223.9	0.9999484

Lambert Projection for Florida - North

Table I (Cont'd.).

Lat.	R ft.	Y' Y value on central meridian feet	Tabular difference for 1 sec. of lat. feet	Scale in units of 7th place of logs	Scale expressed as a ratio
30° 11'	36,024,595.31	430,329.22	101.01867	-223.7	0.9999485
12	36,018,534.19	436,390.34	101.01900	-223.2	0.9999486
13	36,012,473.05	442,451.48	101.01933	-222.3	0.9999488
14	36,006,411.89	448,512.64	101.01950	-221.0	0.9999491
15	36,000,350.72	454,573.81	101.01983	-219.4	0.9999495
30° 16'	35,994,289.53	460,635.00	101.02017	-217.4	0.9999499
17	35,988,228.32	466,696.21	101.02050	-215.0	0.9999505
18	35,982,167.09	472,757.44	101.02083	-212.3	0.9999511
19	35,976,105.84	478,818.69	101.02117	-209.2	0.9999518
20	35,970,044.57	484,879.96	101.02150	-205.7	0.9999526
30° 21'	35,963,983.28	490,941.25	101.02183	-201.9	0.9999535
22	35,957,921.97	497,002.56	101.02217	-197.7	0.9999545
23	35,951,860.64	503,063.89	101.02267	-193.1	0.9999555
24	35,945,799.28	509,125.25	101.02300	-188.2	0.9999567
25	35,939,737.90	515,186.63	101.02333	-182.9	0.9999579
30° 26'	35,933,676.50	521,248.03	101.02367	-177.2	0.9999592
27	35,927,615.08	527,309.45	101.02417	-171.2	0.9999606
28	35,921,553.63	533,370.90	101.02467	-164.8	0.9999621
29	35,915,492.15	539,432.38	101.02500	-158.0	0.9999636
30	35,909,430.65	545,493.88	101.02533	-150.9	0.9999653
30° 31'	35,903,369.13	551,555.40	101.02583	-143.4	0.9999670
32	35,897,307.58	557,616.95	101.02633	-135.5	0.9999688
33	35,891,246.00	563,678.53	101.02683	-127.3	0.9999707
34	35,885,184.39	569,740.14	101.02733	-118.7	0.9999727
35	35,879,122.75	575,801.78	101.02767	-109.8	0.9999747
30° 36'	35,873,061.09	581,863.44	101.02817	-100.5	0.9999769
37	35,866,999.40	587,925.13	101.02867	-90.8	0.9999791
38	35,860,937.68	593,986.85	101.02917	-80.7	0.9999814
39	35,854,875.93	600,048.60	101.02967	-70.3	0.9999838
40	35,848,814.15	606,110.38	101.03033	-59.5	0.9999863
30° 41'	35,842,752.33	612,172.20	101.03067	-48.3	0.9999889
42	35,836,690.49	618,234.04	101.03133	-36.8	0.9999915
43	35,830,628.61	624,295.92	101.03183	-24.9	0.9999943
44	35,824,566.70	630,357.83	101.03233	-12.6	0.9999971
45	35,818,504.76	636,419.77	101.03300	0.0	1.0000000

Lambert Projection for Florida - North

Table I (Cont'd).

Lat.	R ft.	Y ¹ Y value on central meridian feet	Tabular difference for 1 sec. of lat. feet	Scale in units of 7th place of logs	Scale expressed as a ratio
30° 46'	35,812,442.78	642,481.75	101.03350	+ 13.1	1.0000030
	47	35,806,380.77	648,543.76	+ 26.5	1.0000061
	48	35,800,318.73	654,605.80	+ 40.2	1.0000093
	49	35,794,256.65	660,667.88	+ 54.3	1.0000125
	50	35,788,194.53	666,730.00	+ 68.8	1.0000158
30° 51'	35,782,132.38	672,792.15	101.03650	+ 83.6	1.0000192
	52	35,776,070.19	678,854.34	+ 98.8	1.0000227
	53	35,770,007.96	684,916.57	+114.4	1.0000263
	54	35,763,945.70	690,978.83	+130.4	1.0000300
	55	35,757,883.40	697,041.13	+146.7	1.0000338
30° 56'	35,751,821.06	703,103.47	101.03967	+163.4	1.0000376
	57	35,745,758.68	709,165.85	+180.4	1.0000415
	58	35,739,696.26	715,228.27	+197.8	1.0000455
	59	35,733,633.80	721,290.73	+215.6	1.0000496
	31° 00	35,727,571.30	727,353.23	+233.8	1.0000538
31° 01'	35,721,508.75	733,415.78	101.04300	+252.3	1.0000581
	02	35,715,446.17	739,478.36	+271.2	1.0000624
	03	35,709,383.54	745,540.99	+290.5	1.0000669
	04	35,703,320.87	751,603.66	+310.2	1.0000714
	05	35,697,258.16	757,666.37	+330.2	1.0000760
31° 06'	35,691,195.40	763,729.13	101.04683	+350.6	1.0000807
	07	35,685,132.59	769,791.94	+371.3	1.0000855
	08	35,679,069.74	775,854.79	+392.4	1.0000904
	09	35,673,006.85	781,917.68	+413.9	1.0000953
	10	35,666,943.91	787,980.62	+435.8	1.0001003
31° 11'	35,660,880.92	794,043.61	101.05050	+458.0	1.0001055
	12	35,654,817.89	800,106.64	+480.6	1.0001107
	13	35,648,754.81	806,169.72	+503.6	1.0001160
	14	35,642,691.68	812,232.85	+526.9	1.0001213
	15	35,636,628.50	818,296.03	+550.6	1.0001268
31° 16'	35,630,565.28	824,359.25	101.05467	+574.7	1.0001323
	17	35,624,502.00	830,422.53	+599.2	1.0001380
	18	35,618,438.67	836,485.86	+624.0	1.0001437
	19	35,612,375.29	842,549.24	+649.2	1.0001495
	20	35,606,311.86	848,612.67	+674.7	1.0001554

Lambert Projection for Florida - North

Table II.

 $1'' \text{ of long.} = 0''.50252590 \text{ of } \theta$

Long.	θ	Long.	θ	Long.	θ
81° 30'	+1° 30' 27".2797	82° 06'	+1° 12' 21".8238	82° 41'	+0° 54' 46".5194
31	+1 29 57.1282	07	+1 11 51.6722	42	+0 54 16.3678
32	+1 29 26.9766	08	+1 11 21.5207	43	+0 53 46.2163
33	+1 28 56.8251	09	+1 10 51.3691	44	+0 53 16.0647
34	+1 28 26.6735	10	+1 10 21.2176	45	+0 52 45.9132
35	+1 27 56.5220				
81° 36'	+1 27 26.3704	82° 11'	+1 09 51.0660	82° 46'	+0 52 15.7616
37	+1 26 56.2188	12	+1 09 20.9145	47	+0 51 45.6101
38	+1 26 26.0673	13	+1 08 50.7629	48	+0 51 15.4585
39	+1 25 55.9157	14	+1 08 20.6113	49	+0 50 45.3070
40	+1 25 25.7642	15	+1 07 50.4598	50	+0 50 15.1554
81° 41'	+1 24 55.6126	82° 16'	+1 07 20.3082	82° 51'	+0 49 45.0038
42	+1 24 25.4611	17	+1 06 50.1567	52	+0 49 14.8523
43	+1 23 55.3095	18	+1 06 20.0051	53	+0 48 44.7007
44	+1 23 25.1580	19	+1 05 49.8536	54	+0 48 14.5492
45	+1 22 55.0064	20	+1 05 19.7020	55	+0 47 44.3976
81° 46'	+1 22 24.8549	82° 21'	+1 04 49.5505	82° 56'	+0 47 14.2461
47	+1 21 54.7033	22	+1 04 19.3989	57	+0 46 44.0945
48	+1 21 24.5517	23	+1 03 49.2474	58	+0 46 13.9430
49	+1 20 54.4002	24	+1 03 19.0958	59	+0 45 43.7914
50	+1 20 24.2486	25	+1 02 48.9442	83° 00	+0 45 13.6399
81° 51'	+1 19 54.0971	82° 26'	+1 02 18.7927	83° 01'	+0 44 43.4883
52	+1 19 23.9455	27	+1 01 48.6411	02	+0 44 13.3368
53	+1 18 53.7940	28	+1 01 18.4896	03	+0 43 43.1852
54	+1 18 23.6424	29	+1 00 48.3380	04	+0 43 13.0336
55	+1 17 53.4909	30	+1 00 18.1865	05	+0 42 42.8821
81° 56'	+1 17 23.3393	82° 31'	+0 59 48.0349	83° 06'	+0 42 12.7305
57	+1 16 53.1878	32	+0 59 17.8834	07	+0 41 42.5790
58	+1 16 23.0362	33	+0 58 47.7318	08	+0 41 12.4274
59	+1 15 52.8847	34	+0 58 17.5803	09	+0 40 42.2759
82° 00	+1 15 22.7331	35	+0 57 47.4287	10	+0 40 12.1243
82° 01'	+1 14 52.5815	82° 36'	+0 57 17.2772	83° 11'	+0 39 41.9728
02	+1 14 22.4300	37	+0 56 47.1256	12	+0 39 11.8212
03	+1 13 52.2784	38	+0 56 16.9740	13	+0 38 41.6697
04	+1 13 22.1269	39	+0 55 46.8225	14	+0 38 11.5181
05	+1 12 51.9753	40	+0 55 16.6709	15	+0 37 41.3666

Lambert Projection for Florida - North

Table II (Cont'd).

1" of long. = 0°50'25.2590 of θ

Long.	θ	Long.	θ	Long.	θ
83° 16'	+0° 37' 11.2150	83° 51'	+0° 19' 35.9106	84° 26'	+0° 02' 00.6062
17	+0 36 41.0634	52	+0 19 05.7591	27	+0 01 30.4547
18	+0 36 10.9119	53	+0 18 35.6075	28	+0 01 00.3031
19	+0 35 40.7603	54	+0 18 05.4559	29	+0 00 30.1516
20	+0 35 10.6088	55	+0 17 35.3044	30	0 00 00.0000
83° 21'	+0 34 40.4572	83° 56'	+0 17 05.1528	84° 31'	-0 00 30.1516
22	+0 34 10.3057	57	+0 16 35.0013	32	-0 01 00.3031
23	+0 33 40.1541	58	+0 16 04.8497	33	-0 01 30.4547
24	+0 33 10.0026	59	+0 15 34.6982	34	-0 02 00.6062
25	+0 32 39.8510	84° 00	+0 15 04.5466	35	-0 02 30.7578
83° 26'	+0 32 09.6995	84° 01'	+0 14 34.3951	84° 36'	-0 03 00.9093
27	+0 31 39.5479	02	+0 14 04.2435	37	-0 03 31.0609
28	+0 31 09.3963	03	+0 13 34.0920	38	-0 04 01.2124
29	+0 30 39.2448	04	+0 13 03.9404	39	-0 04 31.3640
30	+0 30 09.0932	05	+0 12 33.7889	40	-0 05 01.5155
83° 31'	+0 29 38.9417	84° 06'	+0 12 03.6373	84° 41'	-0 05 31.6671
32	+0 29 08.7901	07	+0 11 33.4857	42	-0 06 01.8186
33	+0 28 38.6386	08	+0 11 03.3342	43	-0 06 31.9702
34	+0 28 08.4870	09	+0 10 33.1826	44	-0 07 02.1218
35	+0 27 38.3355	10	+0 10 03.0311	45	-0 07 32.2733
83° 36'	+0 27 08.1839	84° 11'	+0 09 32.8795	84° 46'	-0 08 02.4249
37	+0 26 38.0324	12	+0 09 02.7280	47	-0 08 32.5764
38	+0 26 07.8808	13	+0 08 32.5764	48	-0 09 02.7280
39	+0 25 37.7293	14	+0 08 02.4249	49	-0 09 32.8795
40	+0 25 07.5777	15	+0 07 32.2733	50	-0 10 03.0311
83° 41'	+0 24 37.4261	84° 16'	+0 07 02.1218	84° 51'	-0 10 33.1826
42	+0 24 07.2746	17	+0 06 31.9702	52	-0 11 03.3342
43	+0 23 37.1230	18	+0 06 01.8186	53	-0 11 33.4857
44	+0 23 06.9715	19	+0 05 31.6671	54	-0 12 03.6373
45	+0 22 36.8199	20	+0 05 01.5155	55	-0 12 33.7889
83° 46'	+0 22 06.6684	84° 21'	+0 04 31.3640	84° 56'	-0 13 03.9404
47	+0 21 36.5168	22	+0 04 01.2124	57	-0 13 34.0920
48	+0 21 06.3653	23	+0 03 31.0609	58	-0 14 04.2435
49	+0 20 36.2137	24	+0 03 00.9093	59	-0 14 34.3951
50	+0 20 06.0622	25	+0 02 30.7578	85° 00	-0 15 04.5466

Lambert Projection for Florida - North

Table II (Cont'd).

1" of long. = 0!50252590 of θ

Long.	θ	Long.	θ	Long.	θ
85° 01'	-0° 15' 34".6982	85° 36'	-0° 33' 10".0026	86° 11'	-0° 50' 45".3070
02	-0 16 04.8497	37	-0 33 40.1541	12	-0 51 15.4585
03	-0 16 35.0013	38	-0 34 10.3057	13	-0 51 45.6101
04	-0 17 05.1528	39	-0 34 40.4572	14	-0 52 15.7616
05	-0 17 35.3044	40	-0 34 10.6088	15	-0 52 45.9132
85° 06'	-0 18 05.4559	85° 41'	-0 35 40.7603	86° 16'	-0 53 16.0647
07	-0 18 35.6075	42	-0 36 10.9119	17	-0 53 46.2163
08	-0 19 05.7591	43	-0 36 41.0634	18	-0 54 16.3678
09	-0 19 35.9106	44	-0 37 11.2150	19	-0 54 46.5194
10	-0 20 06.0622	45	-0 37 41.3666	20	-0 55 16.6709
85° 11'	-0 20 36.2137	85° 46'	-0 38 11.5181	86° 21'	-0 55 46.8225
12	-0 21 06.3653	47	-0 38 41.6697	22	-0 56 16.9740
13	-0 21 36.5168	48	-0 39 11.8212	23	-0 56 47.1256
14	-0 22 06.6684	49	-0 39 41.9728	24	-0 57 17.2772
15	-0 22 36.8199	50	-0 40 12.1243	25	-0 57 47.4287
85° 16'	-0 23 06.9715	85° 51'	-0 40 42.2759	86° 26'	-0 58 17.5803
17	-0 23 37.1230	52	-0 41 12.4274	27	-0 58 47.7318
18	-0 24 07.2746	53	-0 41 42.5790	28	-0 59 17.8834
19	-0 24 37.4261	54	-0 42 12.7305	29	-0 59 48.0349
20	-0 25 07.5777	55	-0 42 42.8821	30	-1 00 18.1865
85° 21'	-0 25 37.7293	85° 56'	-0 43 13.0336	86° 31'	-1 00 48.3380
22	-0 26 07.8808	57	-0 43 43.1852	32	-1 01 18.4896
23	-0 26 38.0324	58	-0 44 13.3368	33	-1 01 48.6411
24	-0 27 08.1839	59	-0 44 43.4883	34	-1 02 18.7927
25	-0 27 38.3355	86° 00	-0 45 13.6399	35	-1 02 48.9442
85° 26'	-0 28 08.4870	86° 01'	-0 45 43.7914	86° 36'	-1 03 19.0958
27	-0 28 38.6386	02	-0 46 13.9430	37	-1 03 19.2474
28	-0 29 08.7901	03	-0 46 44.0945	38	-1 04 19.3989
29	-0 29 38.9417	04	-0 47 14.2461	39	-1 04 49.5505
30	-0 30 09.0932	05	-0 47 44.3976	40	-1 05 19.7020
85° 31'	-0 30 39.2448	86° 06'	-0 48 14.5492	86° 41'	-1 05 49.8536
32	-0 31 09.3963	07	-0 48 44.7007	42	-1 06 20.0051
33	-0 31 39.5479	08	-0 49 14.8523	43	-1 06 50.1567
34	-0 32 09.6995	09	-0 49 45.0038	44	-1 07 20.3082
35	-0 32 39.8510	10	-0 50 15.1554	45	-1 07 50.4598

Lambert Projection for Florida - North

Table II (Cont'd).

1" of long. = 0°50'25.2590 of θ

Long.	θ	Long.	θ	Long.	θ
86° 46'	-1° 08' 20".6113	87° 21'	-1° 25' 55".9157	87° 56'	-1° 43' 31".2201
47	-1 08 50.7629	22	-1 26 26.0673	57	-1 44 01.3717
48	-1 09 20.9145	23	-1 26 56.2188	58	-1 44 31.5232
49	-1 09 51.0660	24	-1 27 26.3704	59	-1 45 01.6748
50	-1 10 21.2176	25	-1 27 56.5220	88° 00	-1 45 31.8263
86° 51'	-1 10 51.3691	87° 26'	-1 28 26.6735		
52	-1 11 21.5207	27	-1 28 56.8251		
53	-1 11 51.6722	28	-1 29 26.9766		
54	-1 12 21.8238	29	-1 29 57.1282		
55	-1 12 51.9753	30	-1 30 27.2797		
86° 56'	-1 13 22.1269	87° 31'	-1 30 57.4313		
57	-1 13 52.2784	32	-1 31 27.5828		
58	-1 14 22.4300	33	-1 31 57.7344		
59	-1 14 52.5815	34	-1 32 27.8859		
87° 00	-1 15 22.7331	35	-1 32 58.0375		
87° 01'	-1 15 52.8847	87° 36'	-1 33 28.1890		
02	-1 16 23.0362	37	-1 33 58.3406		
03	-1 16 53.1878	38	-1 34 28.4922		
04	-1 17 23.3393	39	-1 34 58.6437		
05	-1 17 53.4909	40	-1 35 28.7953		
87° 06'	-1 18 23.6424	87° 41'	-1 35 58.9468		
07	-1 18 53.7940	42	-1 36 29.0984		
08	-1 19 23.9455	43	-1 36 59.2499		
09	-1 19 54.0971	44	-1 37 29.4015		
10	-1 20 24.2486	45	-1 37 59.5530		
87° 11'	-1 20 54.4002	87° 46'	-1 38 29.7046		
12	-1 21 24.5517	47	-1 38 59.8561		
13	-1 21 54.7033	48	-1 39 30.0077		
14	-1 22 24.8549	49	-1 40 00.1592		
15	-1 22 55.0064	50	-1 40 30.3108		
87° 16'	-1 23 25.1580	87° 51'	-1 41 00.4624		
17	-1 23 55.3095	52	-1 41 30.6139		
18	-1 24 25.4611	53	-1 42 00.7655		
19	-1 24 55.6126	54	-1 42 30.9170		
20	-1 25 25.7642	55	-1 43 01.0686		

TRANSVERSE MERCATOR PROJECTION

FLORIDA

East and West Zones

$\Delta \lambda''$	b	Δb	c	$\Delta \lambda''$	b	Δb	c
0	0.000	+0.554	0.000	3100	+10.003	-0.164	-0.133
100	+ 0.554	+0.551	0.000	3200	+ 9.839	-0.209	-0.135
200	+ 1.105	+0.549	-0.001	3300	+ 9.630	-0.256	-0.136
300	+ 1.654	+0.545	-0.002	3400	+ 9.374	-0.304	-0.135
400	+ 2.199	+0.539	-0.003	3500	+ 9.070	-0.355	-0.133
500	+ 2.738	+0.531	-0.005	3600	+ 8.715	-0.405	-0.131
600	+ 3.269	+0.523	-0.007	3700	+ 8.310	-0.459	-0.128
700	+ 3.792	+0.513	-0.010	3800	+ 7.851	-0.513	-0.124
800	+ 4.305	+0.501	-0.014	3900	+ 7.338	-0.569	-0.120
900	+ 4.806	+0.488	-0.018	4000	+ 6.769	-0.629	-0.115
1000	+ 5.294	+0.473	-0.022	4100	+ 6.140	-0.688	-0.109
1100	+ 5.767	+0.457	-0.027	4200	+ 5.452	-0.749	-0.101
1200	+ 6.224	+0.441	-0.032	4300	+ 4.703	-0.810	-0.091
1300	+ 6.665	+0.422	-0.038	4400	+ 3.893	-0.874	-0.078
1400	+ 7.087	+0.401	-0.043	4500	+ 3.019	-0.939	-0.063
1500	+ 7.488	+0.381	-0.049	4600	+ 2.080	-1.005	-0.045
1600	+ 7.869	+0.357	-0.055	4700	+ 1.075	-1.075	-0.025
1700	+ 8.226	+0.333	-0.061	4800	0.000	-1.145	0.000
1800	+ 8.559	+0.307	-0.067	4900	- 1.145	-1.217	+0.026
1900	+ 8.866	+0.280	-0.073	5000	- 2.362	-1.291	+0.053
2000	+ 9.146	+0.252	-0.079	5100	- 3.653	-1.362	+0.084
2100	+ 9.398	+0.222	-0.085	5200	- 5.015	-1.436	+0.117
2200	+ 9.620	+0.190	-0.091	5300	- 6.451	-1.511	+0.153
2300	+ 9.810	+0.156	-0.096	5400	- 7.962	-1.587	+0.191
2400	+ 9.966	+0.122	-0.101	5500	- 9.549	-1.664	+0.232
2500	+10.088	+0.085	-0.106	5600	-11.213	-1.742	+0.275
2600	+10.173	+0.048	-0.111	5700	-12.955	-1.821	+0.321
2700	+10.221	+0.008	-0.116	5800	-14.776	-1.901	+0.371
2800	+10.229	-0.032	-0.121	5900	-16.677	-1.981	+0.426
2900	+10.197	-0.074	-0.125	6000	-18.658		+0.487
3000	+10.123	-0.120	-0.130				

$$F = 7.06 \times 10^{-13}$$

TRANSVERSE MERCATOR PROJECTION

TABLE FOR g

$$\Delta\alpha'' = \sin \phi (\Delta\lambda'') + g$$

Latitude	$\Delta\lambda''$						
	0''	1000''	2000''	3000''	4000''	5000''	6000''
24°	0''00	0''00	0''02	0''07	0''17	0''33	0''58
25	0	0	0.02	0.07	0.17	0.34	0.59
26°	0.00	0.00	0.02	0.08	0.18	0.35	0.60
27	0	0	0.02	0.08	0.18	0.35	0.61
28	0	0	0.02	0.08	0.18	0.36	0.62
29	0	0	0.02	0.08	0.19	0.37	0.63
30	0	0	0.02	0.08	0.19	0.37	0.64
31°	0.00	0.00	0.02	0.08	0.19	0.37	0.64
32	0	0	0.02	0.08	0.19	0.38	0.65
33	0	0	0.02	0.08	0.19	0.38	0.65
34	0	0	0.02	0.08	0.19	0.38	0.65
35	0	0	0.02	0.08	0.19	0.38	0.65
36°	0.00	0.00	0.02	0.08	0.19	0.38	0.65
37	0	0	0.02	0.08	0.19	0.38	0.65
38	0	0	0.02	0.08	0.19	0.38	0.65
39	0	0	0.02	0.08	0.19	0.37	0.64
40	0	0	0.02	0.08	0.19	0.37	0.64
41°	0.00	0.00	0.02	0.08	0.19	0.37	0.63
42	0	0	0.02	0.08	0.18	0.36	0.63
43	0	0	0.02	0.08	0.18	0.36	0.62
44	0	0	0.02	0.08	0.18	0.35	0.61
45	0	0	0.02	0.08	0.18	0.35	0.60
46°	0.00	0.00	0.02	0.07	0.17	0.34	0.59
47	0	0	0.02	0.07	0.17	0.33	0.58
48	0	0	0.02	0.07	0.17	0.33	0.56
49	0	0	0.02	0.07	0.16	0.32	0.55
50	0.00	0.00	0.02	0.07	0.16	0.31	0.54

$$g = \left[\frac{C (\sin 1'') \cos^3 \phi}{2A^2} + F \right] (\Delta\lambda'')^3$$

A, C and F are position factors.

Y CORRECTION FOR COMPUTATION OF GEOGRAPHIC
POSITIONS FROM PLANE COORDINATES
TRANSVERSE MERCATOR PROJECTION, FLORIDA-E-W ZONES

$$P(x'/10,000)^2 + d = V(\Delta Y_{100})^2 + c$$

P taken out for y-coordinate
d taken out for x'

Y	P	ΔP	x'	d
0	1.07987	1383	0	0.00
100,000	1.09370	1390	50,000	0.00
200,000	1.10760	1395	100,000	+ 0.01
300,000	1.12155	1402	150,000	+ 0.02
400,000	1.13557	1408	200,000	+ 0.02
500,000	1.14965	1414	250,000	+ 0.02
600,000	1.16379	1421	300,000	+ 0.01
700,000	1.17800	1428	350,000	- 0.03
800,000	1.19228	1434	400,000	- 0.09
900,000	1.20662	1441		
1,000,000	1.22103	1448		
1,100,000	1.23551	1456		
1,200,000	1.25007	1462		
1,300,000	1.26469	1470		
1,400,000	1.27939	1478		
Y	P	ΔP		
1,500,000	1.29417	1485	2,000,000	1.36920 1525
1,600,000	1.30902	1492	2,100,000	1.38445 1534
1,700,000	1.32394	1501	2,200,000	1.39979 1541
1,800,000	1.33895	1508	2,300,000	1.41520 1551
1,900,000	1.35403	1517	2,400,000	1.43071

TRANSVERSE MERCATOR PROJECTION

Florida

East and west zones

$$\Delta\alpha = Mx' - e$$

y	M	ΔM	y	M	ΔM
0	0.004 4549	571	1,500,000	0.005 3390	613
100,000	0.004 5120	573	1,600,000	0.005 4003	615
200,000	0.004 5693	576	1,700,000	0.005 4618	619
300,000	0.004 6269	578	1,800,000	0.005 5237	623
400,000	0.004 6847	581	1,900,000	0.005 5860	626
500,000	0.004 7428	583	2,000,000	0.005 6486	629
600,000	0.004 8011	586	2,100,000	0.005 7115	632
700,000	0.004 8597	589	2,200,000	0.005 7747	636
800,000	0.004 9186	592	2,300,000	0.005 8383	640
900,000	0.004 9778	595	2,400,000	0.005 9023	644
1,000,000	0.005 0373	597	2,500,000	0.005 9667	
1,100,000	0.005 0970	601			
1,200,000	0.005 1571	603			
1,300,000	0.005 2174	606			
1,400,000	0.005 2780	610			

e

y \ x'	200,000	300,000	400,000	500,000
0	0.0	0.0	0.2	0.4
500,000	0.0	0.0	0.2	0.4
1,000,000	0.0	0.1	0.2	0.5
1,500,000	0.0	0.1	0.2	0.5
2,000,000	0.0	0.1	0.3	0.6
2,500,000	0.0	0.1	0.3	0.7

TRANSVERSE MERCATOR PROJECTION

FLORIDA

East and West Zones

x' (feet)	Scale in units of 7th place of logs	Scale ex- pressed as a ratio	x' (feet)	Scale in units of 7th place of logs	Scale ex- pressed as a ratio
0	-255.5	0.9999412	175,000	-103.1	0.9999763
5,000	-255.4	0.9999412	180,000	- 94.2	0.9999783
10,000	-255.0	0.9999413	185,000	- 85.2	0.9999804
15,000	-254.4	0.9999414	190,000	- 75.8	0.9999825
20,000	-253.5	0.9999416	195,000	- 66.2	0.9999848
25,000	-252.4	0.9999419	200,000	- 56.4	0.9999870
30,000	-251.0	0.9999422	205,000	- 46.4	0.9999893
35,000	-249.4	0.9999426	210,000	- 35.9	0.9999917
40,000	-247.6	0.9999430	215,000	- 25.4	0.9999942
45,000	-245.4	0.9999435	220,000	- 14.6	0.9999966
50,000	-243.0	0.9999440	225,000	- 3.5	0.9999992
55,000	-240.4	0.9999446	230,000	+ 7.8	1.0000018
60,000	-237.6	0.9999453	235,000	+ 19.4	1.0000045
65,000	-234.5	0.9999460	240,000	+ 31.2	1.0000072
70,000	-231.1	0.9999468	245,000	+ 43.3	1.0000100
75,000	-227.5	0.9999476	250,000	+ 55.6	1.0000128
80,000	-223.6	0.9999485	255,000	+ 68.1	1.0000157
85,000	-219.5	0.9999495	260,000	+ 81.0	1.0000187
90,000	-215.2	0.9999504	265,000	+ 93.9	1.0000216
95,000	-210.6	0.9999515	270,000	+107.3	1.0000247
100,000	-205.8	0.9999526	275,000	+121.0	1.0000279
105,000	-200.7	0.9999538	280,000	+134.8	1.0000310
110,000	-195.2	0.9999551	285,000	+148.9	1.0000343
115,000	-189.6	0.9999563	290,000	+163.1	1.0000376
120,000	-183.8	0.9999577	295,000	+177.6	1.0000409
125,000	-177.7	0.9999591	300,000	+192.5	1.0000443
130,000	-171.4	0.9999605	305,000	+207.6	1.0000478
135,000	-164.8	0.9999621	310,000	+222.9	1.0000513
140,000	-157.9	0.9999636	315,000	+238.4	1.0000549
145,000	-150.8	0.9999653	320,000	+254.2	1.0000585
150,000	-143.5	0.9999670	325,000	+270.3	1.0000622
155,000	-135.9	0.9999687	330,000	+286.6	1.0000660
160,000	-128.1	0.9999705	335,000	+303.2	1.0000698
165,000	-119.9	0.9999724	340,000	+319.9	1.0000737
170,000	-111.6	0.9999743	345,000	+336.9	1.0000776

TRANSVERSE MERCATOR PROJECTION

FLORIDA

East and West Zones

x (feet)	Scale in units of 7th place of logs	Scale ex- pressed as a ratio
350,000	+354.3	1.0000816
355,000	+371.8	1.0000856
360,000	+389.7	1.0000897
365,000	+407.7	1.0000939
370,000	+426.0	1.0000981
375,000	+444.5	1.0001023
380,000	+463.3	1.0001067
385,000	+482.3	1.0001111
390,000	+501.6	1.0001155
395,000	+521.2	1.0001200
400,000	+541.0	1.0001246

CORRECTIONS TO NATURAL SCALE RATIOS*
(in units of the 7th decimal place)

For Lambert Projection

$\Delta\phi'$ as argument

<u>$\Delta\phi'$</u>	Corr'n (Plus)	<u>$\Delta\phi'$</u>	Corr'n (Plus)
1	0	31	34
2	0	32	36
3	0	33	38
4	1	34	40
5	1	35	43
6	1	36	45
7	2	37	48
8	2	38	51
9	3	39	53
10	4	40	56
11	4	41	59
12	5	42	62
13	6	43	65
14	7	44	68
15	8	45	71
16	9	46	74
17	10	47	77
18	11	48	81
19	13	49	84
20	14	50	88
21	15	51	91
22	17	52	95
23	19	53	98
24	20	54	102
25	22	55	106
26	24	56	110
27	26	57	114
28	27	58	118
29	29	59	122
30	32	60	126

$\Delta\phi'$ is the difference in latitude in minutes of the ends of the line.

For Lambert or transverse Mercator Projection

<u>Δ_y</u> or <u>Δ_x</u>	Corr'n (Plus)
10,000	0
20,000	0
30,000	1
40,000	2
50,000	2
60,000	3
70,000	5
80,000	6
90,000	8
100,000	10
110,000	11
120,000	14
130,000	16
140,000	19
150,000	21
160,000	24
170,000	27
180,000	31
190,000	34
200,000	38
210,000	42
220,000	46
230,000	50
240,000	55
250,000	59
260,000	64
270,000	69
280,000	74
290,000	80
300,000	86
310,000	91
320,000	97
330,000	103
340,000	110
350,000	116

*Scale ratio interpolated for mean latitude or mean x' of the ends of a line and corrected by the above table is a true mean value accurate to within one in the seventh decimal place.